

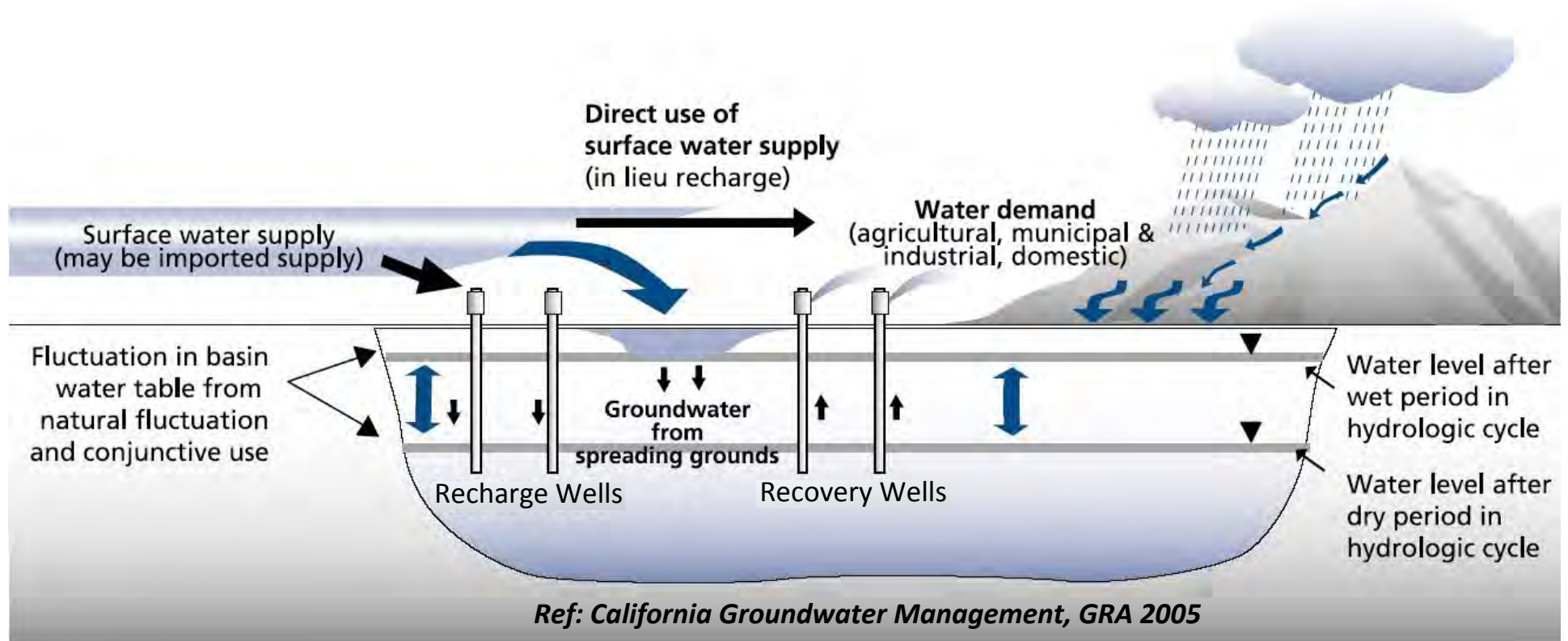


Technical and Policy Challenges to Streamline Groundwater Recharge and Storage

*Tim Parker, Parker Groundwater
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Member, Public Advisory Committee
Director, Groundwater Resources Association
of California*

What Are We Talking About?

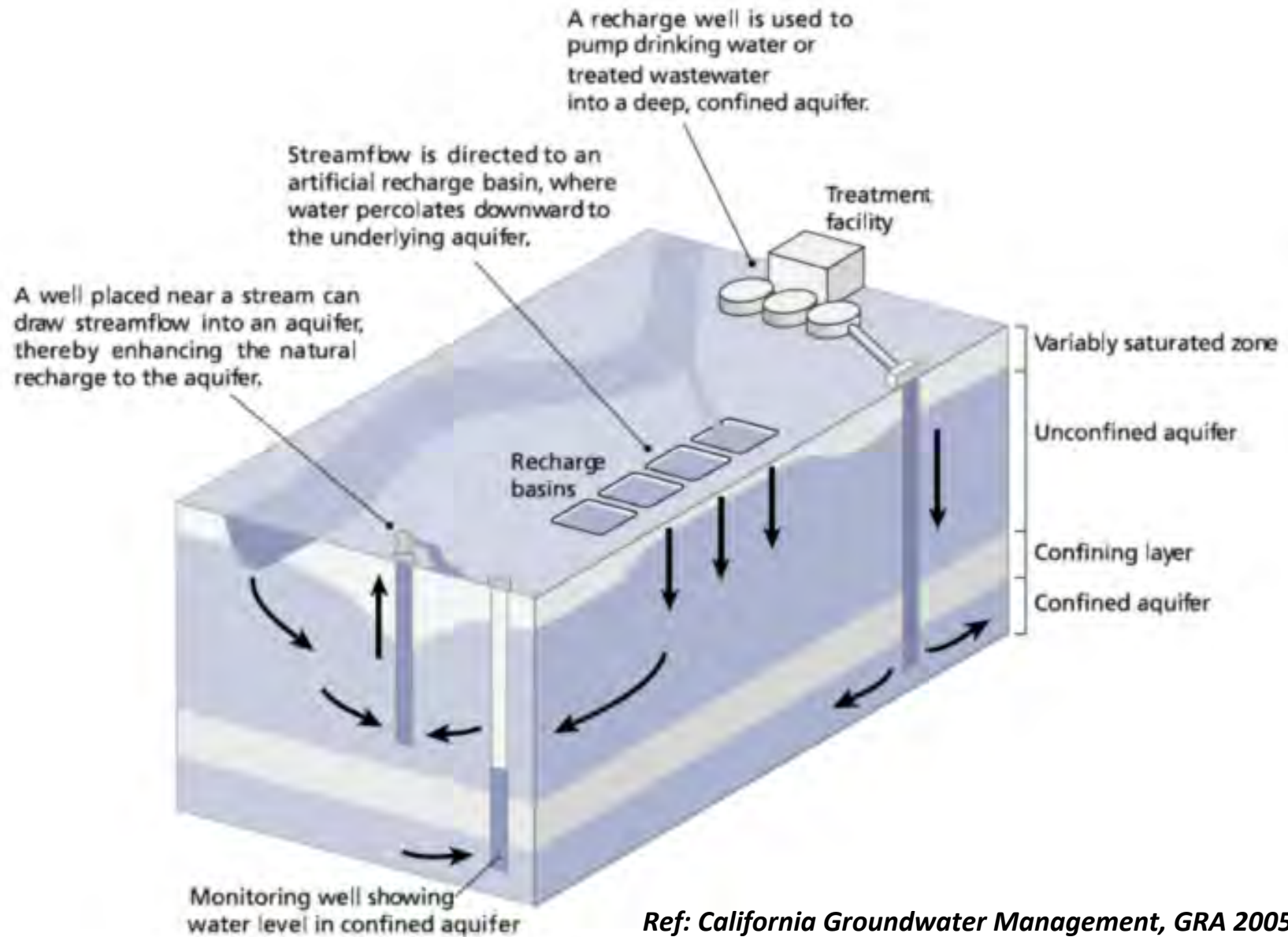
The coordinated and planned management of surface water and groundwater supplies to maximize the efficient use of the resources



Has been practiced for decades in California.

Proven cost effective technique for increasing water supplies.

What Are We Talking About?

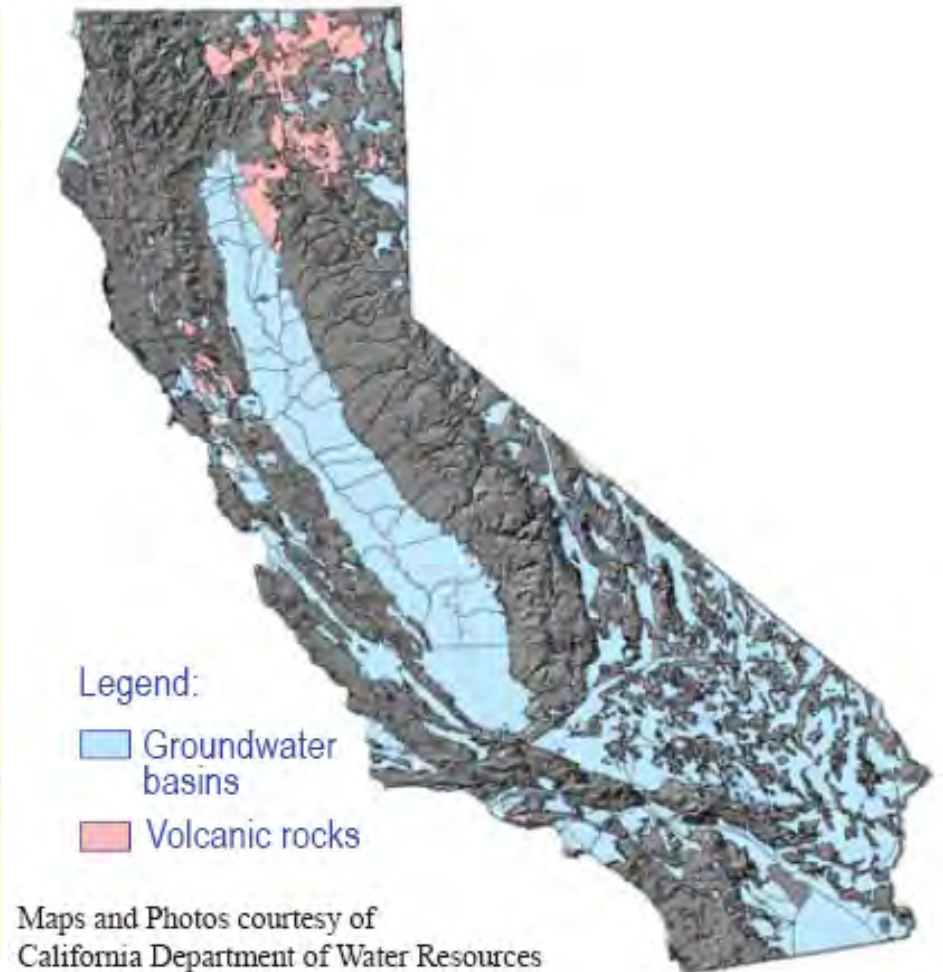
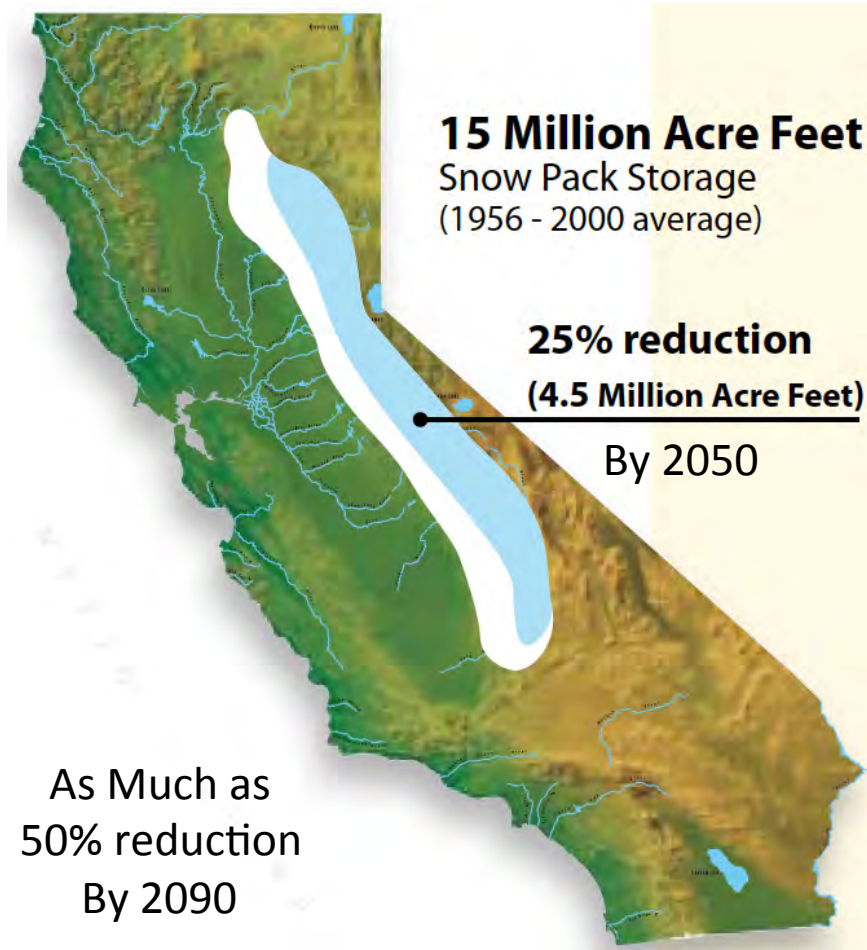


Ref: California Groundwater Management, GRA 2005

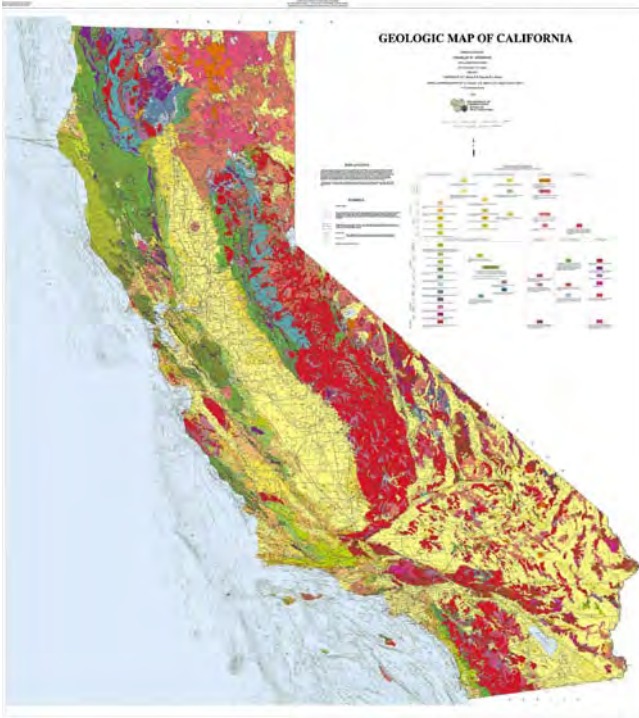
Why Talk About This?

- Increasing demands
- Climate change/warming
- More surface water reservoirs unlikely
- Current major water infrastructure designed middle of the last century based on hydrology which was 'wet'
- Groundwater reservoirs can work to help meet the future needs

Why Talk About This?

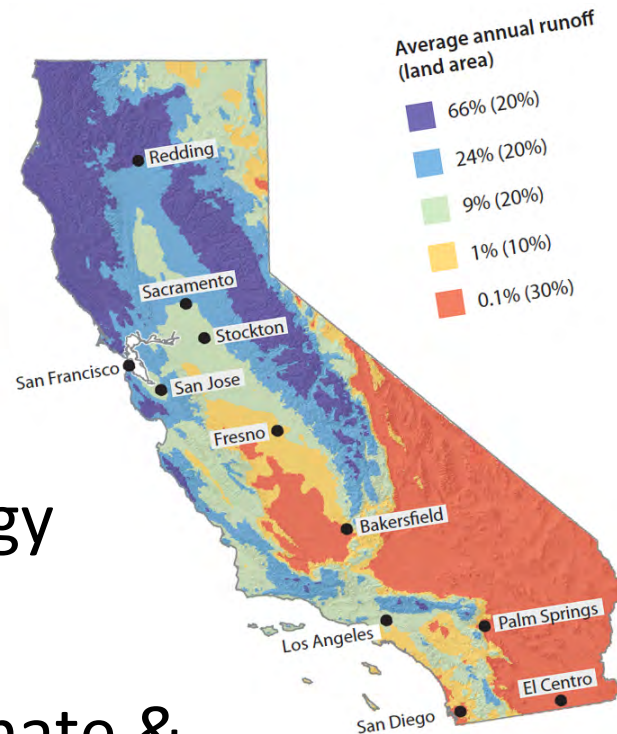


Technical Challenges



Geology & Hydrogeology

Ref: California Geological Survey



Climate & Demand

Ref: Water and the California Economy
Public Policy Institute of California, 2012

Hydrology & Infrastructure

Ref: Department of Water Resources



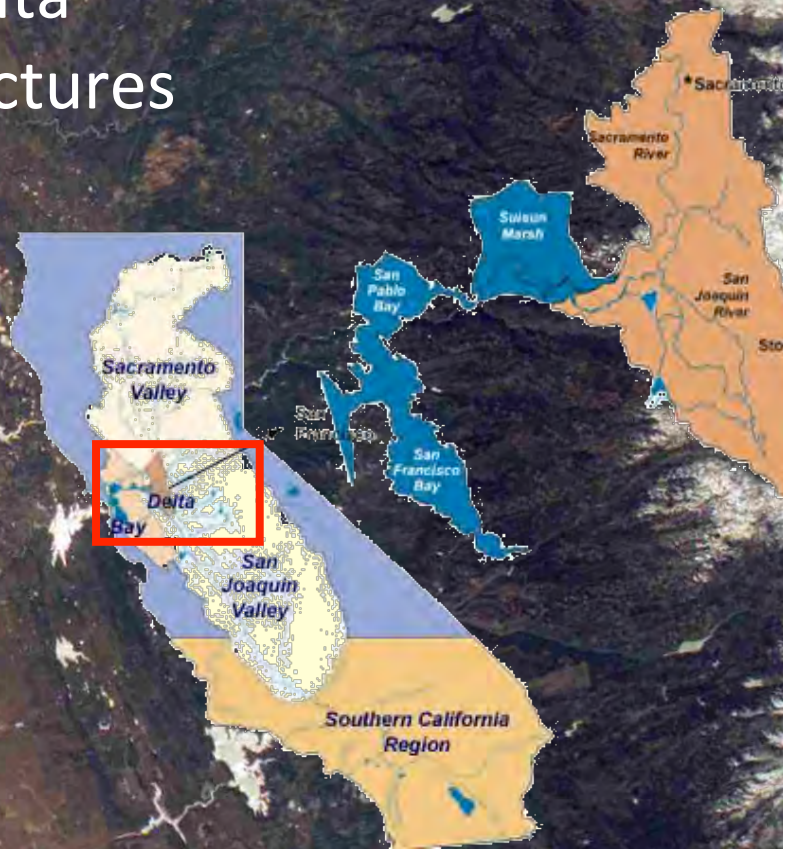
Water from the North to the
South Goes Through.....

The Delta

Fragile water supply conveyance hub

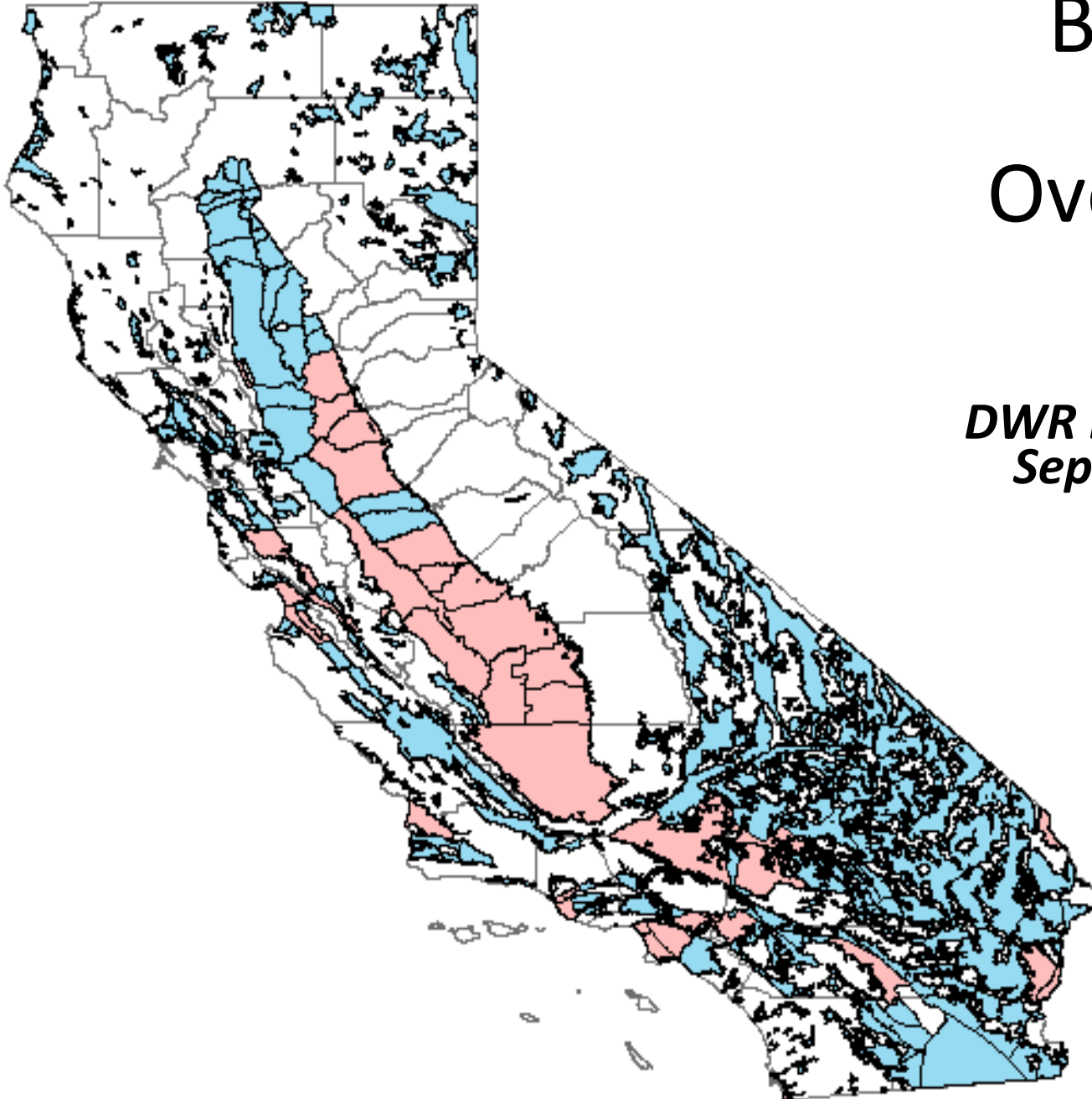
Sacramento–San Joaquin Delta

Deteriorating flood control structures

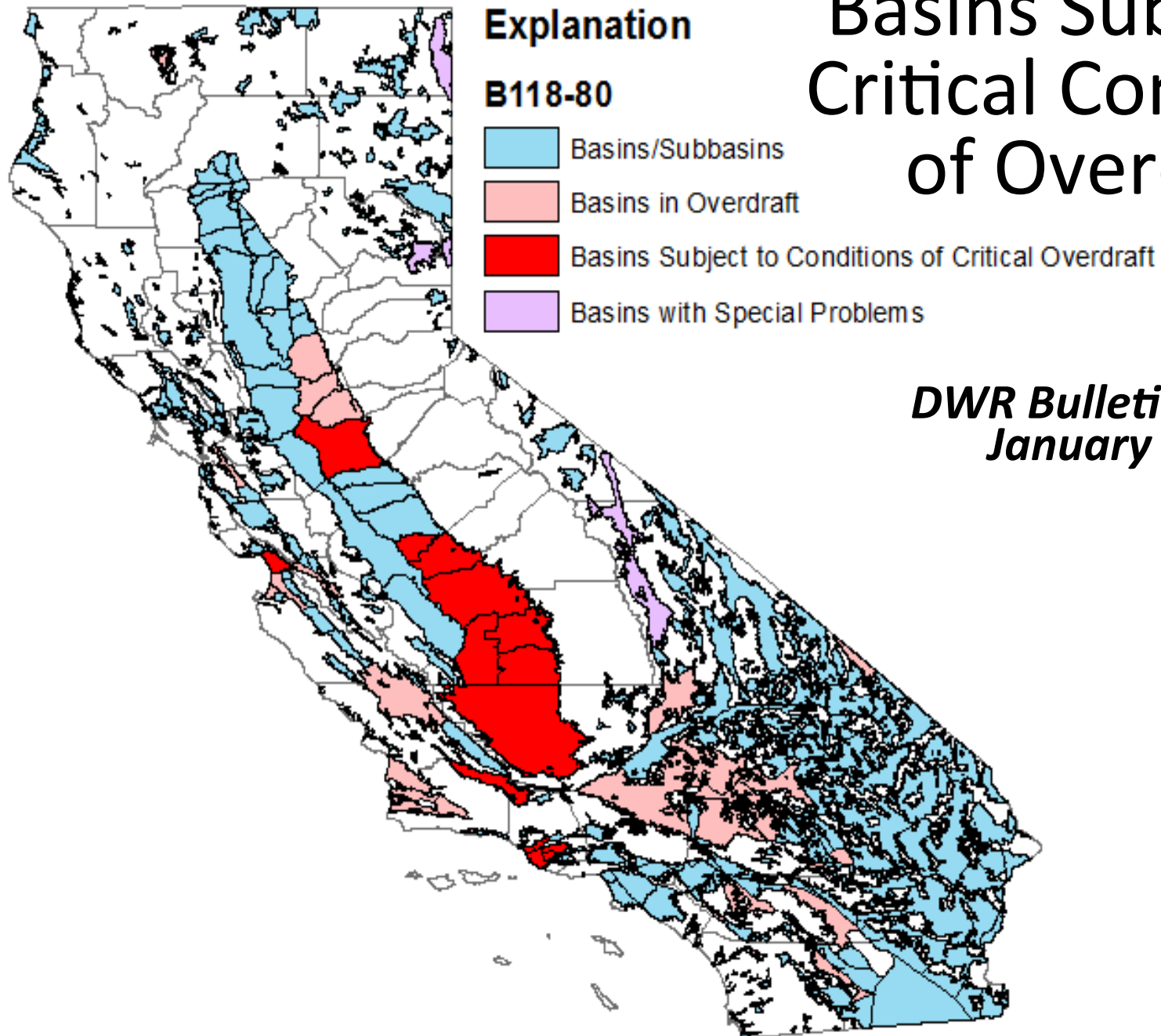


Basins in Overdraft

*DWR Bulletin 118-75
September 1975*



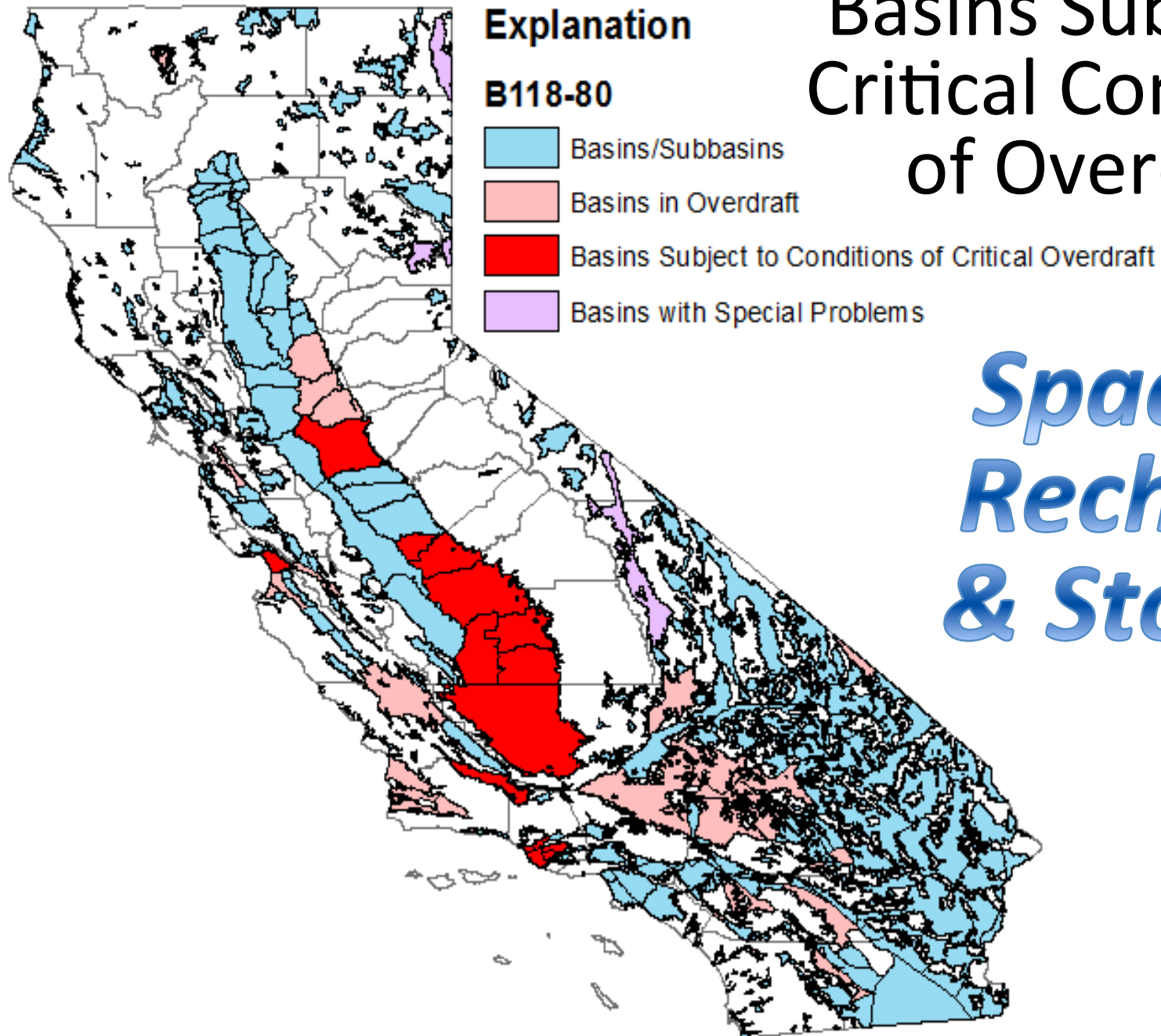
Basins Subject to Critical Conditions of Overdraft



***DWR Bulletin 118-80
January 1980***

Basins Subject to Critical Conditions of Overdraft

*Space for
Recharge
& Storage*



Technical Challenges

- Source water/receiving water mixing and aquifer matrix
 - Possible detrimental water quality effects
- Land, water and carbon footprint
- Water balance & puts and takes
- Economics & setting reasonable objectives
 - *Have tools, technology & knowledge base*
 - *Estimating cost and proving the project*



Policy Challenges

- Permitting policy – declaring drinking water a waste to regulate ASR
- Water rights – groundwater recharge as a beneficial use
- Jurisdictional issues – storage space ownership
- Water markets & transfers – streamlining
- State agency mandates and coordination and need for alignment – no agency has mandate for all aspects

ASR

Living in Two Worlds

Challenge:

- Permitting of recharging potable drinking water to groundwater as a waste discharge
- Recently released proposed general waste discharge requirements for drinking water ASR projects
- SWRCB Adoption Hearing:

September 19, 2012
CalEPA

http://www.waterboards.ca.gov/water_issues/programs/asr/index.shtml

Example of Groundwater Injection/Extraction Well



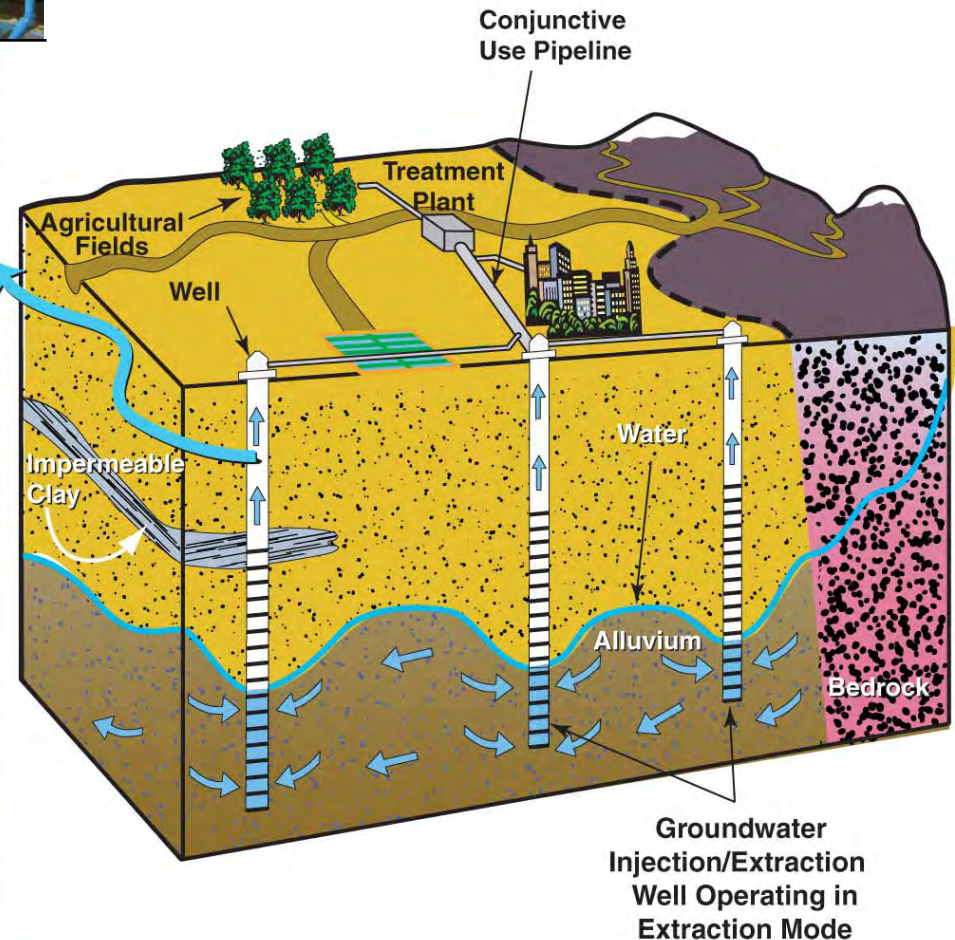
Surface Seal

Casing
Filter Pack

Water Table
Pump Column

Borehole Wall

Turbine Pump



Ref: City of Roseville

Water Rights Permitting Underground Storage Supplement

- **California Code of Regulations Title 23 Section 733**

Requires an application proposing underground storage including

- Diversion points for above ground and subsurface
- Physical works and aquifer structure and capacities, amounts, points and types of measurements, timing and maps

- **Water Code Section 1242**

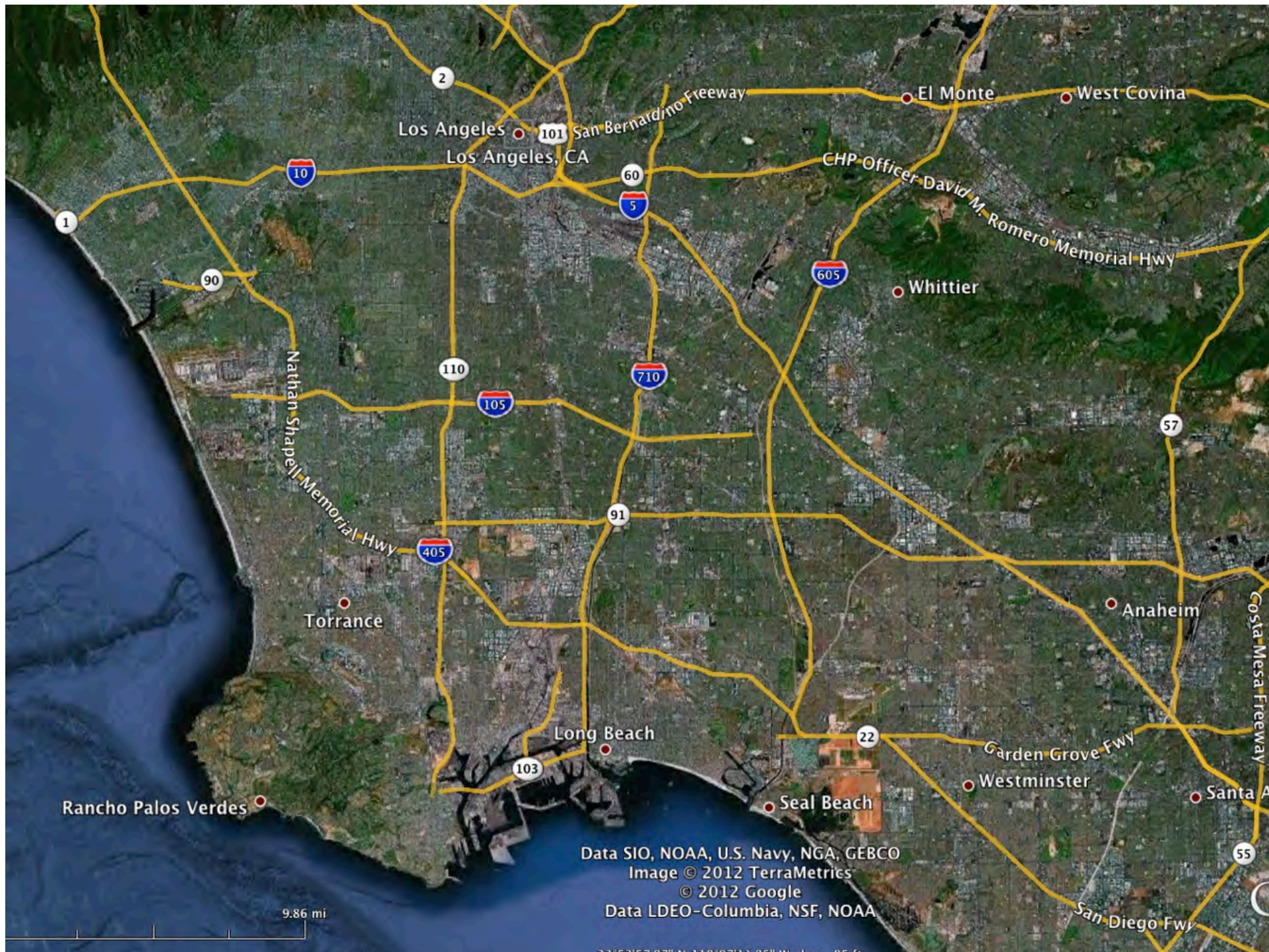
The storing of water underground, including the diversion of streams and the flowing of water on lands necessary to the accomplishment of such storage, constitutes a beneficial use of water if the water so stored is thereafter applied to the beneficial purposes for which the appropriation for storage was made

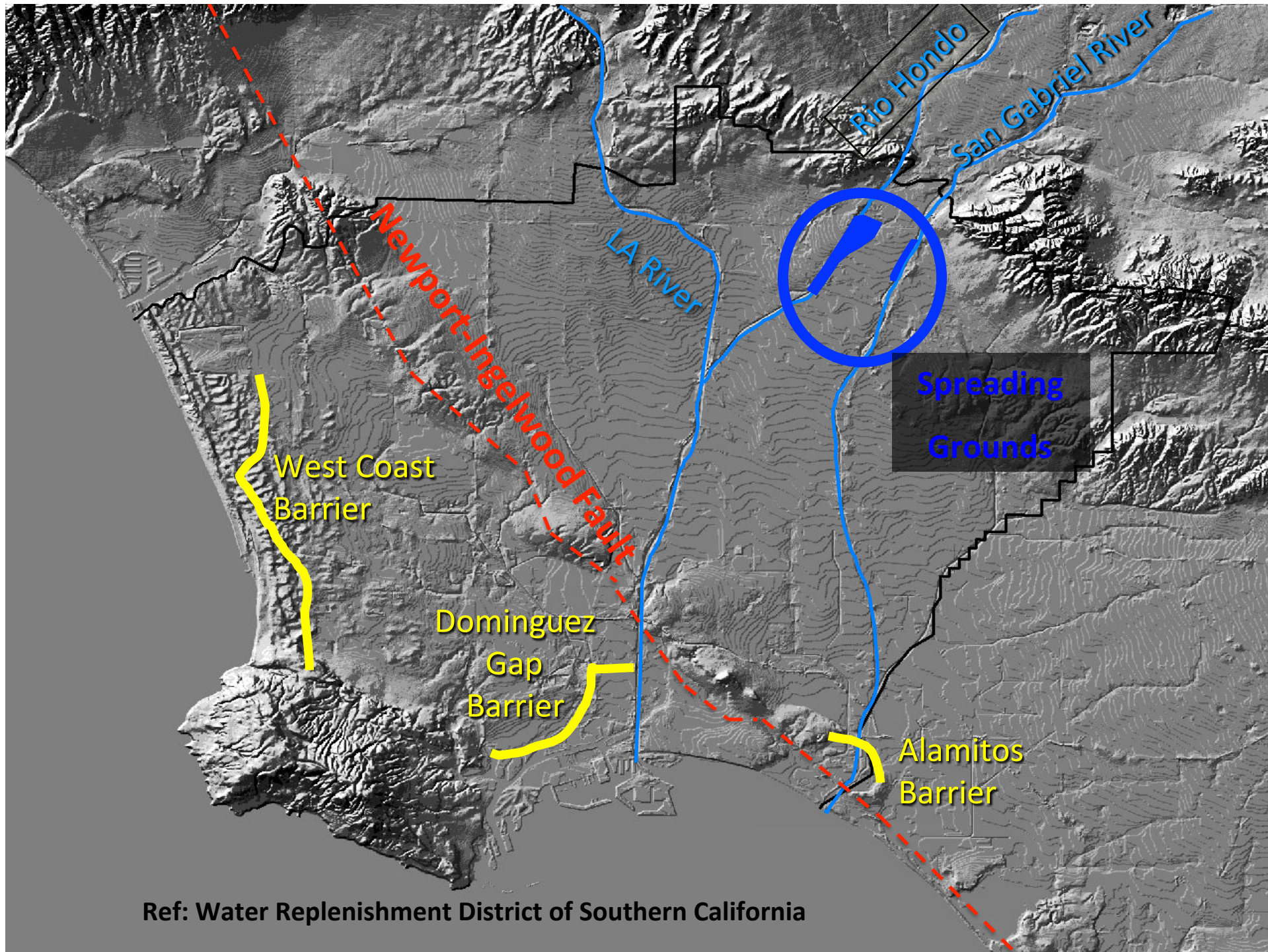
- ***Groundwater recharge is generally not considered a beneficial use***

Aquifer Storage Space Ownership

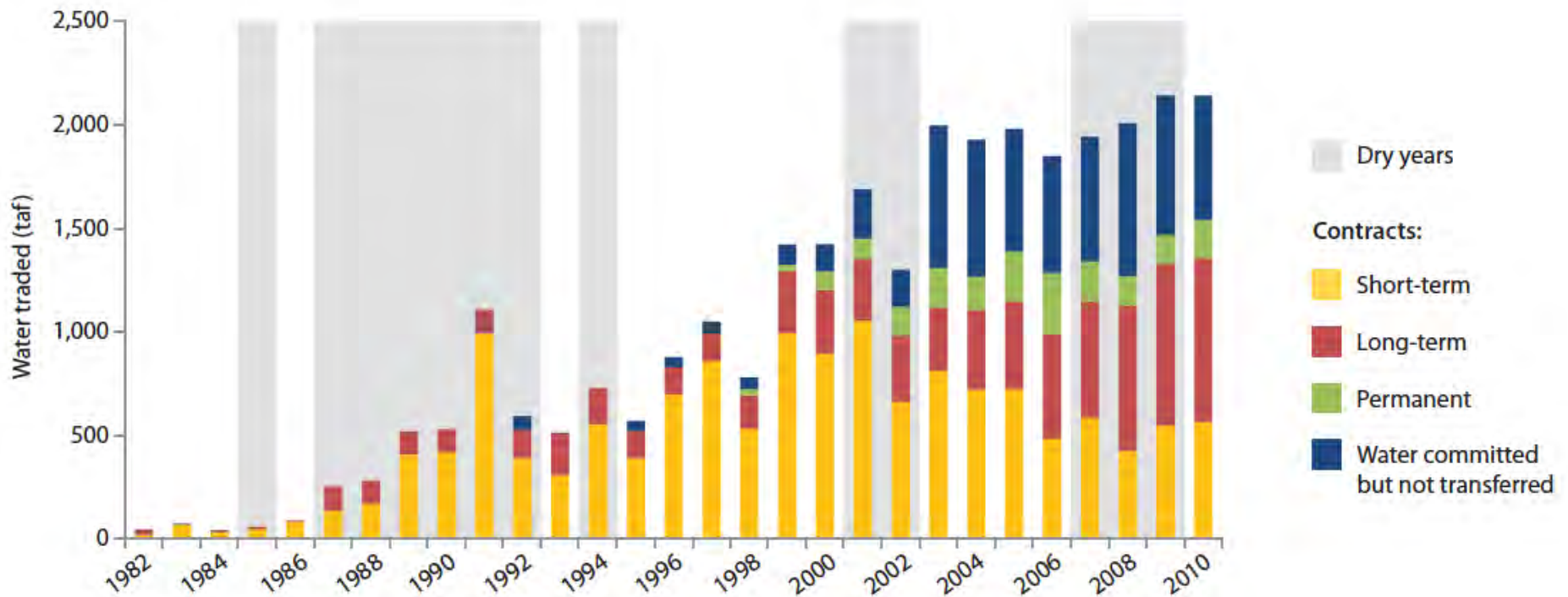
- Water Code is silent on ownership of aquifer storage space
- Challenge occurs when there are overlapping institutional jurisdictions
- Example:
 - Water Replenishment District of Southern California, Cities and Private Companies
 - West Coast and Central Groundwater Basins
 - Courts to decide







Water Markets and Transfers Need for Streamlining



*Ref: Water and the California Economy
Public Policy Institute of California, 2012*

Water Markets and Transfers

Need for Streamlining

- Water transfers use voluntary market mechanisms to reallocate water in line with economic incentives
- Legal and institutional barriers limit market growth
- Short-term (<1yr) transfers subject to SWRCB jurisdiction exempt from environmental review under CEQA
- Not all short-term transfers under SWRCB jurisdiction therefore not exempt and may require EIR
- Long-term transfers require lengthy environmental review (EIR) due to potential long-term impacts
- Would it make sense to conduct a comprehensive study and programmatic EIR for major sources of water transfers? regionally based? by local, regional or statewide agencies?

Agency Mandates and Coordination

State


- State Water Resources Control Board
- California Department of Water Resources
- California Department of Fish and Game
- California Department of Public Health
- California Public Utilities Commission
- California Water Commission
- Central Valley Flood Protection Board

Federal

- U.S. Department of the Interior
- U.S. Bureau of Reclamation
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- National Oceanic and Atmospheric Administration
- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- Federal Emergency Management Agency
- Federal Energy Regulatory Commission

Conclusion & Issues to Discuss

- Should we consider a state agency coordinating committee on groundwater recharge and storage?
- Is it possible to align the mandates, policies and permitting responsibilities of state agencies with respect to groundwater recharge and storage?
- Would it be useful to understand from a local, regional and statewide perspective how much additional groundwater recharge and storage is needed to move towards sustainability?
- Is there research and studies that would be useful to help improve and optimize groundwater recharge facilities with regard to land, water and carbon footprint, and to monitor, measure and manage groundwater storage?

A photograph of a wooden windmill in a dry, open landscape. The windmill has a large, multi-bladed wheel at the top and a wooden frame. It is situated next to a large, leafless tree. The ground is dry and dusty, and the sky is blue with scattered white clouds. The text "Clarifying Questions" is overlaid in the center of the image.

Clarifying Questions